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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
KAZUSHI OSHINO, ET AL.	: EXAMINER: ROBERTS, LEZAH
SERIAL NO: 10/540,266	:
FILED: DECEMBER 7, 2005	: GROUP ART UNIT: 1612
FOR: ORAL PREPARATION SYSTEM	:

DECLARATION UNDER 37 C.F.R §1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Now comes Mr. Atsushi Yamagishi who deposes and states that:

1. I am a graduate of the Graduate School of Nagaoka University of Technology, Materials Science and Technology, and received my Master's degree in the field of Materials Science and Technology, in the year 1988.

2. I have been employed by Kao Corporation, for 20 years involved in research and development of hair care products from 1988 to 1989 and then involved in research and development of oral products from 1989 to present.

3. The following experiments were carried out by me or under my direct supervision and control.

4. The following experiments demonstrate that, surprisingly, the use of sodium fluoride in combination with monofluorophosphate (MFP) increases the amount of fluorine adsorption. Also, monofluorophosphate ions promote aggregation of calcium fluoride so that the amount of monofluorophosphate intake is also increased.

5. Table

Unit (μmol/g)	D1	D2	D3	E1	E2	E3	F1	F2	F3	G1	H1
First Composition											
Calcium Glycerophosphate	50	50	50	1.25	1.25	1.25	200	200	200	200	1.25
Sodium Monofluorophosphate	25	–	50	2.6	–	5.2	105	–	210	–	–
Second Composition											
Sodium Fluoride	25	50	–	2.6	5.2	–	105	210	–	105	2.6
Sodium Monofluorophosphate	–	–	–	–	–	–	–	–	–	105	2.6
Treatment (*1)	Alter-nately	Alter-nately	Mixture	Alter-nately	Alter-nately	Mixture	Alter-nately	Alter-nately	Mixture	Alter-nately	Alter-nately
Fluorine Intake	2.0829	0.9466	0.0477	0.0157	0.0067	0.0046	4.0188	1.4584	0.0884	3.3372	0.0169
MFP-Derived (*2)	0.2818		0.0477	0.0009		0.0046	0.5437		0.0884	0.4515	0.0023
Calcium Fluoride Film	○	○	×	○	○	×	○	○	×	○	○

(*I) Alternately: Immersed alternately in the first and second compositions for 30 seconds each (Immersed for a total of 3 minutes)
Mixture: Immersed in the mixture of the first and second compositions for 3 minutes
(*2) MFP: Sodium monofluorophosphate
(*3) O: A calcium fluoride film is formed
(*4) ς: A calcium fluoride film is not formed
The rest comprises purified water.

6. Method for Measuring Fluorine Intake

(1) A HAP pellet was treated alternately with the first composition of 10 ml and the second composition of 10 ml for 30 seconds each (total 3 minutes) or was treated with the mixture of the first composition and the second composition for 3 minutes. The treating method is the same as the method described in "b. Quantitative determination of amount of fluorine adsorption on HAP pellet" on pages 18-19 of the present specification.

(2) Comparative Examples were also conducted at a pH 7.

7. Method for Measuring MFP-Derived Fluorine Intake

The first mixture was mixed with the second mixture to form calcium fluoride particles. The calcium fluoride particles were separated and subjected to measurement of the ratio of the number of moles of MFP to the number of moles of F by ion chromatography. In

D3, E3 and F3 each comprising only sodium monofluorophosphate as the component that contains fluorine, the amount of the fluorine intake was measured by determining the fluorine adsorption amount of the HAP pellet described in the present specification.

The fluorine intake amount was obtained by measuring the HAP pellet directly; however, the amount of the intake of MFP-derived fluorine was measured by ion chromatography of the calcium fluoride formed. Therefore, the measured value of MFP-derived fluorine intake compared to the measured value of fluorine intake may not be accurate; however, this data can be compared as a relative amount (the ratio of MFP-derived fluorine intake amount to fluorine intake amount). The method for measuring above-mentioned fluorine intake is different from the method for measuring above-mentioned MFP-derived fluorine intake.

8. As shown in the Table above, when the same amount of calcium ion is present, D1, E1 and F1 of the claimed system (each comprises MFP and sodium fluoride) show a higher fluorine intake amount compared to that of D2, D3, E2, E3, F2 and F3 (each comprises MFP or sodium fluoride).

9. Moreover, when the amount of calcium is large (as in D1 and F1), it is clear that the amount of the MFP intake is significantly increased even though the MFP concentration is half of that of D3 and F3. From the results of D1, E1 and F1, the amount of the MFP intake is also increased when the calcium ion amount is 5 μmol/g or more. When the MFP and calcium amounts are low (as in E1), the amount of the MFP intake is not always likely to be large. However, the fluorine intake (and the calcium fluoride film formation) is advantageous compared to the non-inventive systems of E2 and E3.

10. In G1, wherein the second composition comprises sodium fluoride and MFP, a significant increase in the amount of the fluorine intake and the MFP intake is noted, compared to F2 and F3 in which the calcium amount is the same and sodium fluoride or MFP

is not used. In H1, wherein the second composition comprises sodium fluoride and MFP, an increase in the fluorine intake compared with E2 and E3 is shown.

It is also clear that F1, wherein sodium fluoride and MFP are separately contained in different compositions, is excellent in both of the fluorine intake and MFP intake, which is comparable with G1, wherein sodium fluoride and MFP are contained in the same composition.

11. It is clear from the data of the Table above that the use of sodium fluoride in combination with MFP increases the amount of fluorine adsorption. When the calcium amount is enough, monofluorophosphate ions promote aggregation of calcium fluoride so that the amount of monofluorophosphate intake is also increased.

12. According to the claimed system, because of the presence of fluorine ion supplying compound (B), monofluorophosphate intake is remarkable increased as shown in the Table.

13. In the claimed system, by combining the fluorine ion supplying compound (B) with the combination of (A) and (C), and further with monofluorophosphate ion supplying compound (D), monofluorophosphate ions inhibit aggregation of calcium fluoride, thereby increasing not only the amount of calcium fluoride to be formed but also monofluorophosphate intake to teeth.

14. Because of the presence of the monofluorophosphate ion supplying compound (D), the size of calcium fluoride particles is decreased, so that a calcium fluoride coating is formed without any space (see the SEM picture "S1" shown below; a clearer copy is attached with the Declaration). In the composition containing no monofluorophosphate ions, compared with the coating of the present invention, the size of calcium fluoride particles is larger and non-uniform, and areas in which no coating is formed are observed (see the SEM picture "S2" shown below; a clearer copy is attached with the Declaration). Since the size of

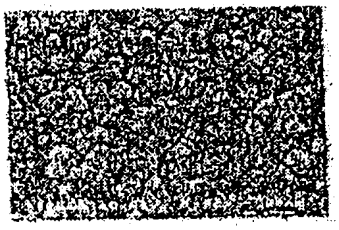
the calcium fluoride particles is large, the area that the calcium fluoride particles are in contact with a coating object (HAP pellet surface, that is, teeth surfaces) is small (i.e., the adhesion is low), so that a space is created between the coating object and calcium fluoride particles. The claimed system changes the quality and form of the coating of calcium fluoride by containing (D).

To take the SEM pictures shown below, S1 and S2, calcium lactate was used as the calcium ion supplying compound (A) because using calcium glycerophosphate leads to time-dependent changes that make photography difficult.

15. By using the claimed system, monofluorophosphate ions are incorporated into calcium fluoride, and the fluorine intake is dramatically higher than that of the comparative examples (see the Table above and compare, e.g., inventive compositions D1, E1, and F1 to compositions D2, E2, and F2 and composition D3, E3, and F3). More specifically, the claimed system exerts an excellent effect in increasing the quality and amount of calcium fluoride thus formed, and in increasing both of monofluorophospliate and fluorine intakes.

SEM Pictures

S1



S1 corresponds to the claimed invention.

First composition: Sodium fluoride (50 mmol/1)

Second composition: Calcium lactate (50 mmol/1) and sodium monofluorophosphate (50 mmol/l)

S2

S2 does not correspond to the claimed invention.

First composition: Sodium fluoride (50 mmol/l)

Second composition: Calcium lactate (50 mmol/l)

The method for treating HAP in SEM pictures

HAP pellets (Apaceran APP-100, PENTAX) were each treated with the first composition and the second composition alternately three times for 30 seconds. The total treatment time for each pellet was 3 minutes.

The above SEM pictures show the surface condition of the treated HAP pellets.

17. Concerning F1 to F3, please consider the following points.

The content of fluorine is limited worldwide. The amount of fluorine which is allowed to be contained in one agent is limited to be 5,000 ppm or less. Since 210 μmol/g is about 4,000 ppm, in the case where the concentration of sodium monofluorophosphate and that of sodium fluoride in F1 are set to the upper limit of 210 μmol/g each, the fluorine ion amount of F2 and that of F3 become 420 μmol/g (=about 8,000 ppm) each. Such a fluorine ion concentration is an unrealistic concentration in formula (composition), so that the fluorine ion concentration of F2 and that of F3 are set to 210 μmol/g each, while the concentration of sodium monofluorophosphate and that of sodium fluoride in F1 are set to 105 μmol/g each.

Considering the preferable ratio of calcium ion to fluorine ion from the viewpoint of calcium fluoride formation, the calcium ion concentration is adjusted in F1 to F3, along with the adjustment of the fluorine ion amount mentioned above.

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18. Under penalty of perjury under the laws of the United States of America that the foregoing is believed to be true and correct.

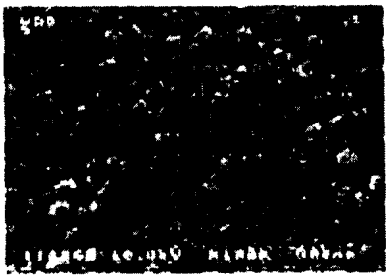
Atsushi Yamagishi

Atsushi Yamagishi

May 20, 2010

Date

(S 1)



(S 2)